

Remarks

Applicant's representatives thank the Examiner for his consideration of the issues and the treatment of the issues in the Final Office Action of 27 October 2008, as well as the courtesies extend to the Applicant's representative during prior interviews. Applicant hereby requests reconsideration of this Application based on the following remarks.

Currently, claims 1, 6-16, 46, 49, 55-59, 61, 64-73, and 78-88 are pending, with claims 1, 46, 61 and 73 being the independent claims.

Claims 1, 6-8, 10-16, 46, 49, 55-59, 61, 64-66, 68-73, and 78-88 are rejected under 35 U.S.C. § 103(a) as obvious over GB 164 (Great Britain 1,010,164). Claims 9 and 67 are rejected under 35 U.S.C. § 103(a) as obvious over GB 164 in view of Duke (US 3,573,072).

Applicant respectfully traverses the obviousness rejection of claims 1, 6-8, 10-16, 46, 49, 55-59, 61, 64-66, 68-73, and 78-88, as well as the rejections of claims 9 and 67. Of these claims, claims 1, 46, 61, and 73 are independent. Each of claims 1, 46, 61, and 73 recites that the formed glass article is dipped in a molten salt bath "for 10 seconds or less." Each of the pending claims include this feature, and as fully discussed in the previous responses, as well as the personal interview of 22 July 2008, this feature is neither disclosed or suggested by the prior art.

The lowest dipping duration disclosed by the prior art is 15 seconds. [See also Examiner's comments in the Final Office Action dated 6 July 2007: bottom of page ; Applicant's Response of 11 April 2007: pages 7-8; Applicant's Response of 2 October 2007: paragraph bridging pages 7 and 8; and Applicant's arguments in the Pre-Appeal Brief Request; Applicant's Response of 12 September 2008: page 7.] A fair reading of the GB 164 patent, as a whole, clearly reveals that 15 seconds does not in any way disclose or suggest the range of 10 seconds or less and that the GB 164 reference establishes 15 seconds as the minimum time contemplated for the process. Therefore, not only does GB 164 not suggest the claimed time period, but it even teaches away from it.

In support of this position, Applicant has cited to several passages from the GB 164 reference in previous responses. They are summarized here again, and they are further elaborated upon.

According to the GB 164 reference, the dipping time must be sufficiently long to affect the appropriate strengthening, “[a]t lower temperatures the effect of such contact is so slow that production of glass articles herein contemplated cannot be achieved within periods of time which are commercially practicable.” [GB 164 p. 3: *lines 11-15.*] The GB 164 reference also explains:

Contacting the glass with the potassium treating salt for times substantially less than 5 minutes can be satisfactorily conducted provided that sufficiently high temperatures are employed to secure the necessary potassium exchange in the surface region of the glass article being treated . . .

That is to say that in order to secure the utmost benefits of the strength characteristics which can be imparted to glass articles according to the present invention, it is necessary to conduct the potassium exchange so that there is a depth penetration of potassium for at least a finite thickness towards the mid-plane of the glass article. Thus, the increase in strength is sufficiently deep on a penetration level so that subsequent abrasive treatment . . . will not cause substantial loss of strength characteristic . . .

Another factor to be considered when lower contact times, viz., contact treating times substantially below 5 minutes, are employed is the effect the higher treating temperatures can have upon viscosity characteristics of the glass article being treated.

[GB 164 p. 3: *lines 91-129.*]

Therefore, selection of the dipping time has criticality as it affects other processing parameters such as the temperature of the bath and as it the time for the ion exchange via dipping is critical to the strengthening of the glass itself. This time is disclosed as being “usually 5 to 25 minutes.” [GB 164 p. 1: 44-46.], as noted above.

The GB 164 reference discloses seven examples that are treated in the salt bath. Of the seven examples, all but one treat the samples by dipping them for **10 minutes or more**. Only example IV uses a dipping time less than 10 minutes; it uses 15-60 seconds.

GB 164 cautions against dipping times of less than 5 minutes by noting the criticality of the bath temperature, as well as other properties such as viscosity. GB 164 generally cautions against the use of the high temperatures [see the excerpts from page 3 above] as necessitated by reduction of dipping times. Further, as the ion exchange time is a critical parameter, reduction of the dipping time cannot be reduced so much that sufficient ion exchange does not occur. Therefore, the viscosity of the salt bath fluid, the temperature of the salt bath, and other processing parameters must be properly adjusted to allow proper ion exchange despite the reduced dipping time. GB 164 does not enable such a process for dipping times of 10 seconds or less. GB 164, on page 4, at lines 35-65, attempts to enable a process with a reduced dipping time, but it is again blatantly obvious that the disclosed process is intended for time ranges of 15-60 seconds -- a time period of 50-600% larger than the **maximum** of the claimed range -- and not 10 seconds or less. [GB 164 p. 4: line 53.] To this end, not only are all of the examples disclosed by the GB 164 patent dipped at substantially longer dipping times, but the disclosed methodology is drawn to these substantially longer dipping times as well. Indeed, there is not a single disclosure or suggestion in the GB 164 patent that its process is applicable to dipping times in the range of 10 seconds or less. Even in the case of example IV, which is the only disclosure of a dipping time of 15 seconds, only samples 42-47 and 60-65 are dipped at 15 seconds and the remaining samples, 48-59 and 66-77, are dipped for longer periods of up to 60 seconds. This again confirms that GB 164 establishes 15 seconds as the lowest dipping time limit for its process, and that 15 seconds is not an exemplary value suggesting lower ranges in general. It is impossible to glean from GB 164 a dipping time of 10 seconds or less without impermissible hindsight.

In addition to the physical and concrete process difference of differing dipping times between the method of the present invention and the method disclosed by GB 164 patent, the process of GB 164 does not suggest to the skilled artisan to reduce the dipping time to increase strengthening. According to the GB 164 reference, the strength improvement of the treated glass is predicated on the amount of ion

exchange. In example IV, the only instance where the dipping time is as low as 15 seconds, the salt bath is maintained at a temperature of 950°F. [GB 164 p. 12: line 21.] The substance of this bath, the potassium nitrate, [GB 164 p. 12: line 18] has a melting temperature of 633°F (334°C). Given that the temperature of the bath is over 300°F higher than the melting point of the potassium nitrate, the liquid in the bath is fluid and has low viscosity. Therefore, when the glass is removed from the bath for the subsequent 15 minute out-of-tank heating, the low viscosity fluid of the salt bath substantially drips off of the samples. As such, the available potassium for the ion exchange is less than the examples where the glass remains immersed for longer periods. As a result, the glass treated for 15 seconds according to the GB 164 process is expected to have less of a strength improvement over the samples which are treated for longer periods of time. In the results section for example IV, GB 164 merely discloses that samples 42-77 have "superior load strengths as compared to the conventional polished soda-lime-silica glass (Samples 78-113, respectively) which were not subjected to potassium treatment in accordance with this invention." [GB 164 p. 12: lines 54-59.] Therefore, the improvement in strength is mentioned only with respect to completely untreated samples and no comparison is provided to samples dipped for longer times. Additionally, no specific strength data is provided for the samples of example IV, in contrast to the longer-dipped samples of the other examples, for which specific strength values are provided. Therefore, no improvement is taught or suggested as a result of the lowered dipping time. If any thing, the reader is lead to assume that the improvement is better for the samples dipped for 10 minutes based on the description of the process of the GB 164 reference and based on the fact that specific improvement values are provided only for the samples dipped 10 minutes. [GB 164, the tables at pages 6, 9, 10, 11.] To this end, GB 164 does not suggest to a person of ordinary skill to reduce the dipping time to 10 seconds or less and does not render obvious the present claims.

For these reasons, Applicant believes that the claimed range is a distinct and unobvious operating range which is not fairly disclosed or suggested by the prior art--and is in no way a mere example of or a mere trivial extension over a disclosed process.

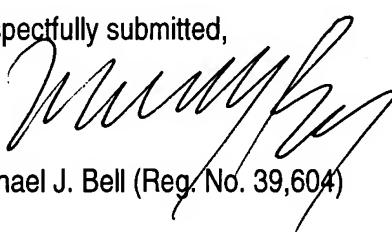
For at least the reasons above, it is respectfully requested that the Examiner withdraw the pending rejections and pass the application to issue.

Conclusion

Applicants respectfully submit that the foregoing remarks demonstrate that entry of these amendments places the present application in condition for allowance, or in the alternative, better form for appeal. All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,



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